CLAIMS:

1. A microdispensing apparatus for sampling, collecting and dispensing a compound in small volumes of liquid, the apparatus comprising:

(a) a jetting tube comprising an orifice for dispensing liquid therefrom at one end and an aperture at the other end;

(b) a transducer coupled with the jetting tube and adapted to apply a pressure pulse to the jetting tube in response to an electrical signal applied to the transducer such that liquid in the jetting tube is caused to move; and characterized by

(c) retaining means for collecting, capturing or at least temporarily retaining one or more compounds from liquid contacting said means in the apparatus; and

wherein the transducer is disposed between the retaining means and the orifice of the jetting tube.

2. A microdispensing apparatus for sampling, collecting and dispensing a compound in small volumes of liquid, the apparatus comprising:

(a) a jetting tube comprising an orifice for dispensing liquid therefrom at one end and an aperture at the other end;

(b) a transducer coupled with the jetting tube and adapted to apply a pressure pulse to the jetting tube in response to an electrical signal applied to the transducer such that liquid in the jetting tube is caused to move; and characterized by

(c) retaining means for collecting, capturing or at least temporarily retaining one or more compounds from liquid contacting said means in the apparatus;

wherein said retaining means forms part of and modifies an inner surface of the jetting tube and wherein at least a part of that modified inner surface extends and is located between the aperture of the jetting tube and the transducer.

3. The apparatus of claim 1 wherein the retaining means is positioned in a tube which is adjacent to and co-axial with the jetting tube.

4. The apparatus according to claim 1 wherein the jetting tube comprises a glass capillary.

5. The apparatus according to claim 1 wherein the transducer is selected from the group consisting of piezoelectric, magneto-strictive, electro-strictive, and electro-mechanical.

6. The apparatus according to claim 1 wherein the retaining means is formed of reactive material capable of retaining a compound or mixture of compounds.

7. The apparatus according to claim 6 wherein the retaining means is a stationary phase.

8. The apparatus according to claim 7 wherein the stationary phase is selected from the group consisting of chromatography materials and substrates, physical packings which contain reactive groups capable of binding and releasing compounds, surface active groups capable of binding and releasing compounds, immobilized ligands, and derivatized surfaces.

9. The apparatus according to claim 1 wherein the retaining means is a derivatized stationary phase material in the form of a high performance liquid chromatography (HPLC) column packing.

10. The apparatus according to claim 1 comprising a plurality of jetting tubes under the control of the same or separate transducers.

11. The apparatus according to claim 10 wherein the plurality of jetting tubes have the same or different means for collecting, capturing or retaining one or more compounds.

12. The apparatus according to claim 1 arranged for collection and dispensing of a compound selected from the group consisting of chemicals, pesticides, herbicides, drugs, biomolecules including proteins, peptides, glycopeptides and other modified peptides, glycoproteins, nucleic acids, hormones, steroids, enzymes, co-factors, recombinant proteins, antigens, antibodies and their fragments.

13. A system for sampling, collecting and dispensing a compound in small volumes of liquid, the apparatus comprising:

(a) a microdispensing apparatus comprising a jetting tube consisting of an orifice for dispensing liquid therefrom at one end and an aperture at the other end; a transducer coupled with the jetting tube and adapted to apply a pressure pulse to the jetting tube in response to an electrical signal applied to the transducer such that liquid in the jetting tube is caused to move; and retaining means for collecting, capturing or at

least temporarily retaining one or more compounds from liquid contacting said means in the apparatus;

wherein the transducer is disposed between the retaining means and the orifice of the jetting tube;

(b) means for applying an electrical signal to the transducer;

(c) means for controlling the strength and frequency of the electrical signal to control the precise movement of liquid to and from the jetting tube;

(d) means for applying a sample to the jetting tube such that at least some compounds in the sample are captured or retained by the collecting means of the microdispensing apparatus; and

(e) means for providing liquid to or from the jetting tube such that the tube may be washed and any compounds captured or retained by the collecting means be eluted or removed.

14. The system according to claim 13 further comprising:

(f) means for arraying eluted compounds, preferably on X-Y target, onto a capture device.

15. The system according to claim 14 wherein the capture device is selected from the group consisting of membranes, microtitre plates, micro-total analysis systems, metal and glass surfaces, glass capillaries and derivatized surfaces, silica-based media and derivatized forms, synthetic resins and derivatized forms, cross-linked polystyrene styrene, divinylbenzene; cross-linked polysaccharides and derivatized forms, cross-linked acrylamide and derivatized forms, polymethacrylate and derivatized forms, polyhydroxymethacrylate and derivatized forms, polyvinyl alcohol and derivatized forms, and paramagnetic beads and derivatized forms.

16. The system according to claim 17 wherein the membranes are formed of polyvinylidene fluoride, polyurethane, nitrocellulose, nylon, teflon, gortex, or combinations thereof.

17. The system according to claim 13 further comprising:

(g) means for controlling means (d), (e) and (f).

18. The system according to claim 17 wherein means (g) is a computer.

19. The system according to claim 13 further comprising:

(h) means for analyzing the eluted compound.

20. The system according to claim 19 wherein the capture device is a device designed to be inserted into an analyzer (h).

21. The system according to claim 20 wherein the analyzer is selected from the group consisting of photoelectrical, photochemical, laser, radiochemical, and mass spectral devices.

22. The system according to claim 21 wherein the analyzer is a matrix-assisted laser desorption ionization-time of flight mass spectrometer (MALDI-TOF MS).

23. A method of sampling, collecting and arraying small quantities of a compound in a liquid sample on a target, the method comprising the steps of:

(a) providing a microdispensing apparatus comprising a jetting tube comprising an orifice for dispensing liquid therefrom at one end and an aperture at the other end; a transducer coupled with the jetting tube and adapted to apply a pressure pulse to the jetting tube in response to an electrical signal applied to the transducer such that liquid in the jetting tube is caused to move; and retaining means for collecting, capturing or retaining one or more compounds from liquid contacting said means and wherein the transducer is disposed in the microdispensing apparatus between the means for collecting , capturing or at least temporarily retaining one or more compounds from liquid in the jetting tube and the orifice of the jetting tube;

(b) applying a liquid sample containing a compound to the jetting tube of the microdispensing apparatus such that at least some of the compound in the sample is retained by the collecting means;

(c) optionally washing the jetting tube to remove any non-bound material present in the jetting tube;

(d) eluting the retained compound from collecting means; and

(e) arraying the eluted compound in small volumes onto a capture device.

24. The method according to claim 23 wherein steps (b) to (e) are repeated or cycled so as to carry out a series of separations of a number of different samples.

25. The method according to claim 23 further comprising:

(f) analyzing the arrayed and eluted compound.

26. The method according to claim 23 wherein the capture device is adapted to be inserted into an analyzer.

27. The method according to claim 26 wherein the analyzer is selected from the group consisting of photoelectrical, photochemical, laser, radiochemical, and mass spectral analyzers.

28. The method according to claim 26 wherein the analyzer is a matrix-assisted laser desorption ionization-time of flight mass spectrometer (MALDI-TOF MS).

29. The method according to claim 23 wherein the sample is applied through the orifice of the jetting tube to the collecting means and the compound eluted through the orifice.

30. The method according to claim 23 wherein the compound is selected from the group consisting of chemicals, pesticides, herbicides, drugs, biomolecules including proteins, peptides, glycopeptides and other modified peptides, glycoproteins, nucleic acids, hormones, steroids, enzymes, co-factors, recombinant proteins, antigens, antibodies and their fragments.

31. The method according to claim 30 wherein the compound is one or more peptides or modified peptides cleaved from a protein.

32. The method according to claim 23 wherein the liquid sample is selected from the group consisting of environmental, clinical including urine, plasma, blood products, solubilized tissues, solutions of peptide fragments of proteins, and solutions of gene fragments.

33. A system for sampling, collecting and dispensing a compound in small volumes of liquid, the apparatus comprising:

(a) a jetting tube comprising an orifice for dispensing liquid therefrom at one end and an aperture at the other end;

(b) a transducer coupled with the jetting tube and adapted to apply a pressure pulse to the jetting tube in response to an electrical signal applied to the transducer such that liquid in the jetting tube is caused to move; and characterized by

(c) retaining means for collecting, capturing or at least temporarily retaining one or more compounds from liquid contacting said means in the apparatus; and

wherein the transducer is disposed between the retaining means and the orifice of the jetting tube.

34. The apparatus of claim 33 wherein the retaining means is positioned in a tube which is adjacent to and co-axial with the jetting tube.

35. The apparatus according to claim 34 wherein the jetting tube comprises a glass capillary.

36. The apparatus according to claim 33 wherein the transducer is selected from the group consisting of piezoelectric, magneto-strictive, electro-strictive, and electro-mechanical.

37. A microdispensing apparatus for sampling, collecting and dispensing a compound in small volumes of liquid, the apparatus comprising:

(a) a jetting tube comprising an orifice for dispensing liquid therefrom at one end and an aperture at the other end;

(b) a transducer coupled with the jetting tube and adapted to apply a pressure pulse to the jetting tube in response to an electrical signal applied to the transducer such that liquid in the jetting tube is caused to move; and characterized by

(c) a retainer for collecting, capturing or at least temporarily retaining one or more compounds; and

wherein the transducer is disposed between the retainer and the orifice of the jetting tube.

38. The apparatus of claim 37 wherein the retainer forms part of and modifies an inner surface of the jetting tube and wherein at least a part of that modified inner surface extends and is located between the aperture of the jetting tube and the transducer.